

CLAIMS

1. A composition comprising:

ferromagnetic particles having a magnetite coating.
2. The composition of Claim 1, wherein the ferromagnetic particles comprise iron or iron alloys.
3. The composition of Claim 2, wherein the iron alloys comprise iron – silicon, iron – aluminum, iron – silicon – aluminum, iron – nickel, iron – cobalt, iron – cobalt – nickel or combinations comprising at least one the foregoing iron alloys.
4. The composition of Claim 1, wherein the ferromagnetic particles comprise iron and wherein the particles are platelets, fibers, particulates, rods, or combinations comprising at least one of the foregoing.
5. The composition of Claim 1, wherein the ferromagnetic particles consist essentially of iron.
6. The composition of Claim 1, wherein the ferromagnetic particles comprise iron and wherein the particles have fractal geometries.
7. The composition of Claim 1, wherein the ferromagnetic particles comprise water atomized iron.
8. The composition of Claim 1, wherein the ferromagnetic particles have an average particle size as determined by the average mass radius of gyration of about 10 to about 1,000 micrometers prior to coating and compaction.
9. The composition of Claim 1, wherein the ferromagnetic particles have an aspect ratio of greater than or equal to about 2.
10. The composition of Claim 1, wherein the ferromagnetic particles have an aspect ratio of greater than or equal to about 10.

11. The composition of Claim 1, wherein the ferromagnetic particles are fibers having an average length of about 3 to about 25 millimeters.

12. The composition of Claim 1, wherein the ferromagnetic particles are fibers having an average diameter of about 10 to about 2000 micrometers.

13. The composition of Claim 1, wherein the magnetite coating has a thickness of about 0.1 to about 2 micrometers.

14. The composition of Claim 1, wherein the composition comprises magnetite in an amount of less than or equal to about 0.2 wt%, based on the total weight of the composition.

15. The composition of Claim 1, wherein the magnetite coating covers at least 50% of the surface area of the ferromagnetic particles.

16. The composition of Claim 1, wherein the composition comprises an additional coating of a metal oxide or a polymeric resin or a combination comprising at least one of the foregoing coatings.

17. The composition of Claim 1, wherein the composition comprises an additional coating comprising a silicate, silicon carbide, silicon nitride or a combination comprising at least one of the foregoing coatings.

18. The composition of Claim 1, wherein the composition comprises an additional coating comprising a Si-O-C network.

19. The composition of Claim 18, wherein the additional coating is disposed upon the magnetite coating

20. An article manufactured from the composition of Claim 1.

21. A method comprising:

coating ferromagnetic particles with magnetite; and

compacting the particles to a desired shape.
22. The method of Claim 21, further comprising annealing the shape.
23. The method of Claim 21, further comprising cleaning the ferromagnetic particles prior to coating the particles.
24. The method of Claim 21, wherein the coating covers at least 50% of the surface area of the ferromagnetic particles.
25. The method of Claim 21, wherein the pressure applied during compaction is about 250 to about 1,500 mega Pascals.
26. The method of Claim 21, wherein the ferromagnetic particles are further coated with a polymeric resin, and wherein the polymeric resin is silicone.
27. The method of Claim 26, wherein the ferromagnetic particles are further annealed to convert the silicone to a network comprising silicate, silicon carbide, silicon nitride or a combination comprising at least one of the foregoing networks.
28. The method of Claim 26, wherein the ferromagnetic particles are further annealed to convert the silicone to a Si-O-C network.
29. An article manufactured from the method of Claim 21.